

CLAIMS

The following is claimed:

1. An improved method of fabricating a micro-mechanical device, the method comprising:
 - 5 depositing at least one sacrificial layer on a substrate;
 - curing the sacrificial layer;
 - fabricating a micro-mechanical device on the sacrificial layer;
 - removing the sacrificial layer by immersing the substrate in a cleansing solution comprising super-critical carbon dioxide and a solvent suitable to remove the sacrificial layer.
- 10 2. A method according to claim 1, wherein the solvent is selected from the group consisting of methanol, ethanol, ethyl acetate, methyl acetate, acetone, methylethylketone, or methyl tertiary-butyl ether.
- 15 3. A method according to claim 1, wherein the sacrificial layer comprises a photoresist solution.
4. A method according to claim 3, wherein the photoresist solution comprises a mixture of novolac resin and a photoresist solvent.
5. A method according to claim 1, wherein the step of curing the sacrificial layer comprises a hard bake.

6. A method according to claim 1, wherein the step of curing the sacrificial layer comprises a soft bake.

7. A method according to claim 1, wherein the step of curing the sacrificial layer comprises UV hardening.

5 8. A method according to claim 1, wherein the step of removing the sacrificial layer further comprises agitating the cleansing solution with an impeller.

9. A method according to claim 1, wherein the cleansing solution further comprises a non-ionic surfactant solution.

10 10. A method according to claim 9, wherein the non-ionic surfactant solution comprises a polystyrene-b-poly(1,1-dihydroperfluorooctyl acrylate) copolymer.

11. An improved method of fabricating a micro-mechanical device, the method comprising:

depositing at least one sacrificial layer on a substrate;

curing the sacrificial layer;

15 fabricating a micro-mechanical device on the first sacrificial layer;

removing the first sacrificial layer;

recoating the micro-mechanical device with a recoat layer of sufficient thickness to completely encapsulate the micro-mechanical device;

curing the recoat layer;

removing the recoat layer by immersing the substrate in a cleansing solution comprising super-critical carbon dioxide and a solvent suitable to remove the sacrificial layer.

12. A method according to claim 11, wherein the solvent is selected from the group consisting of methanol, ethanol, ethyl acetate, methyl acetate, acetone, methylethylketone, or methyl tertiary-butyl ether.

13. A method according to claim 11, wherein the recoat layer comprises a mixture of novolac resin and a photoresist solvent.

14. A method according to claim 13, wherein the recoat layer does not contain a photoactive compound.

15. A method according to claim 11, wherein the step of curing the recoat layer comprises a hard bake.

16. A method according to claim 11, wherein the step of curing the recoat layer comprises a soft bake.

17. A method according to claim 11, wherein the step of curing the recoat layer comprises UV hardening.

18. A method according to claim 11, wherein the step of removing the recoat layer further comprises agitating the cleansing solution with an impeller.

19. A method according to claim 11, wherein the cleansing solution further comprises a non-ionic surfactant solution.

20. A method according to claim 19, wherein the non-ionic surfactant solution comprises a polystyrene-b-poly(1,1-dihydroperfluorooctyl acrylate) copolymer.

21. An improved method of fabricating a micro-mechanical device, the method comprising:

5 depositing a first sacrificial layer on a substrate;

removing portions of the first sacrificial layer to define a first set of vias;

depositing a first metal layer on the first sacrificial layer;

removing portions of the first metal layer to define a set of first via supports;

depositing a second sacrificial layer on the first metal layer;

10 removing portions of the second sacrificial layer to define a second set of vias;

depositing a second metal layer on the second sacrificial layer;

removing portions of the second metal layer to define a set of second vias;

removing the first and second sacrificial layers by immersing the substrate in a
cleansing solution comprising super-critical carbon dioxide and a solvent suitable to
15 remove the sacrificial layers.

22. A method according to claim 21, wherein the solvent is selected from the group consisting of methanol, ethanol, ethyl acetate, methyl acetate, acetone, methylethylketone, or methyl tertiary-butyl ether.

23. A method according to claim 21, wherein the first and second sacrificial layers comprise a photoresist solution.

24. A method according to claim 23, wherein the photoresist solution comprises a mixture of novolac resin and a photoresist solvent.

5 25. A method according to claim 21, wherein the step of removing the sacrificial layers further comprises agitating the cleansing solution with an impeller.

26. A method according to claim 21, wherein the cleansing solution further comprises a non-ionic surfactant solution.

10 27. A method according to claim 26, wherein the non-ionic surfactant solution comprises a polystyrene-b-poly(1,1-dihydroperfluorooctyl acrylate) copolymer.

28. An improved method of fabricating a micro-mechanical device, the method comprising:

depositing a first sacrificial layer on a substrate;

removing portions of the first sacrificial layer to define a first set of vias;

15 depositing a first metal layer on the first sacrificial layer;

removing portions of the first metal layer to define a set of first via supports;

depositing a second sacrificial layer on the first metal layer;

removing portions of the second sacrificial layer to define a set of second via forms;

depositing a second metal layer on the second sacrificial layer;

removing portions of the second metal layer to define a set of second via supports;

recoating the micro-mechanical device with a recoat layer of sufficient thickness
to completely encapsulate the micro-mechanical device;

5 curing the recoat layer;

removing the recoat layer by immersing the substrate in a cleansing solution
comprising super-critical carbon dioxide and a solvent suitable to remove the recoat
layer.

29. A method according to claim 28, wherein the solvent is selected from the group
10 consisting of methanol, ethanol, ethyl acetate, methyl acetate, acetone, methylethylketone, or
methyl tertiary-butyl ether.

30. A method according to claim 28, wherein the recoat layer comprises a mixture of
novolac resin and a photoresist solvent.

31. A method according to claim 30, wherein the recoat layer does not contain a
15 photoactive compound.

32. A method according to claim 28, wherein the step of curing the recoat layer
comprises a hard bake.

33. A method according to claim 28, wherein the step of curing the recoat layer
comprises a soft bake.

34. A method according to claim 28, wherein the step of curing the recoat layer comprises UV hardening.

35. A method according to claim 28, wherein the step of removing the sacrificial layer further comprises agitating the cleansing solution with an impeller.

5 36. A method according to claim 28, wherein the cleansing solution further comprises a non-ionic surfactant solution.

37. A method according to claim 36, wherein the non-ionic surfactant solution comprises a polystyrene-b-poly(1,1-dihydroperfluorooctyl acrylate) copolymer.